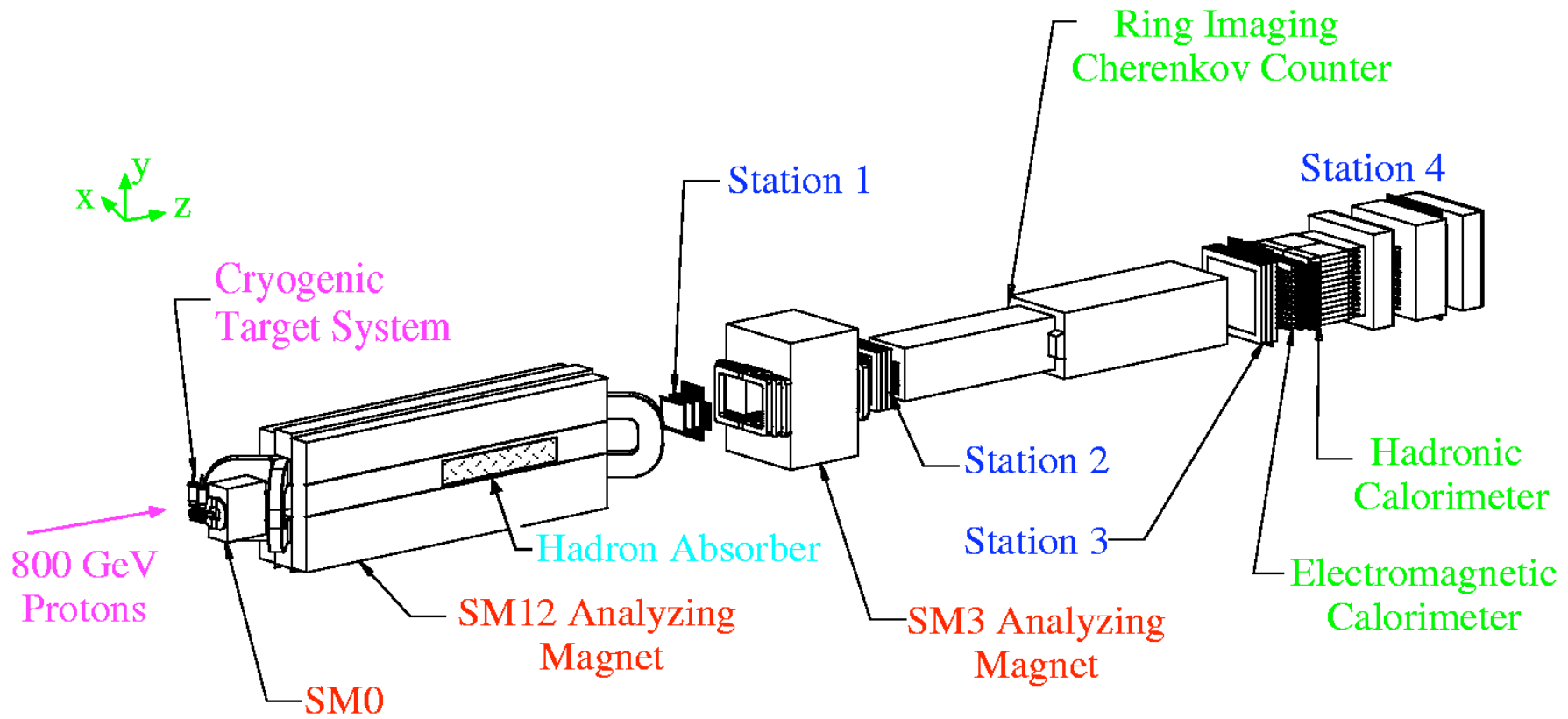


E605/772/789/866 Spectrometer Design

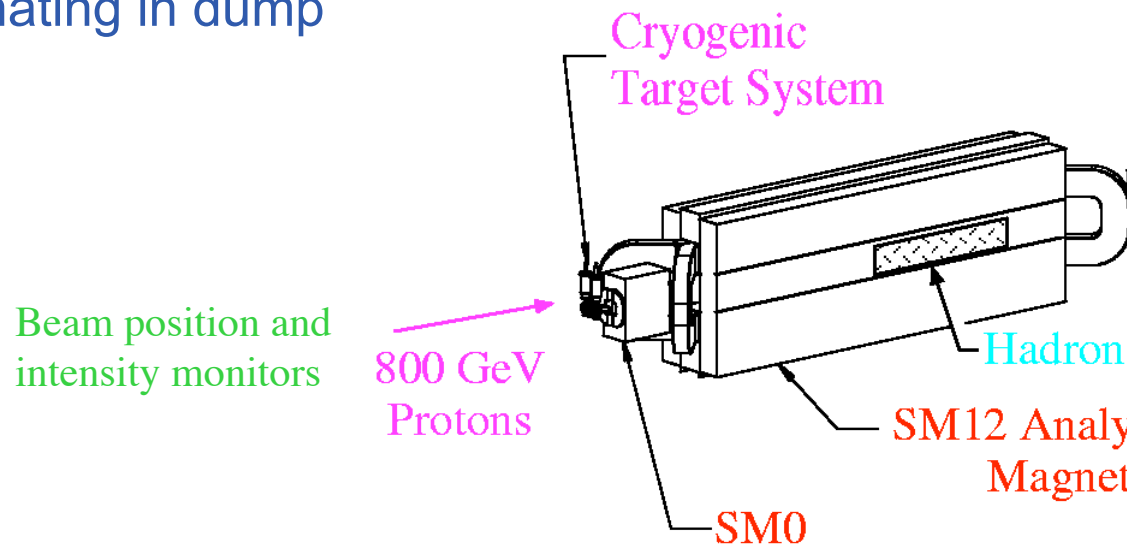


E906 Meeting at LANL

January 8, 2009

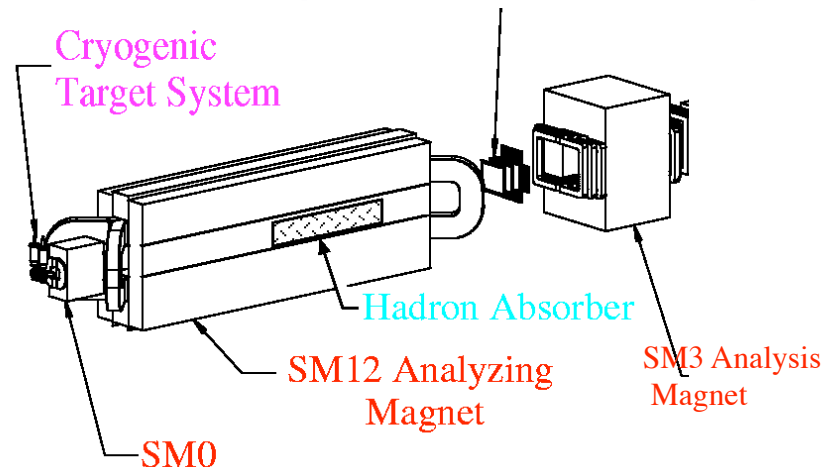
Beam and Cryogenic Targets

- 800 GeV proton beam, $\sim 10^{11}$ protons per second
- Beam intensity (SEM) and X-Y position monitors (SWIC and RF cavity)
- LH₂ and LD₂ targets, 3" dia x 20" long, on movable platform
- Copper beam dump, 12' long, downstream in SM12 magnet
- Targets and dump sufficiently separated in Z to allow for rejection of tracks originating in dump



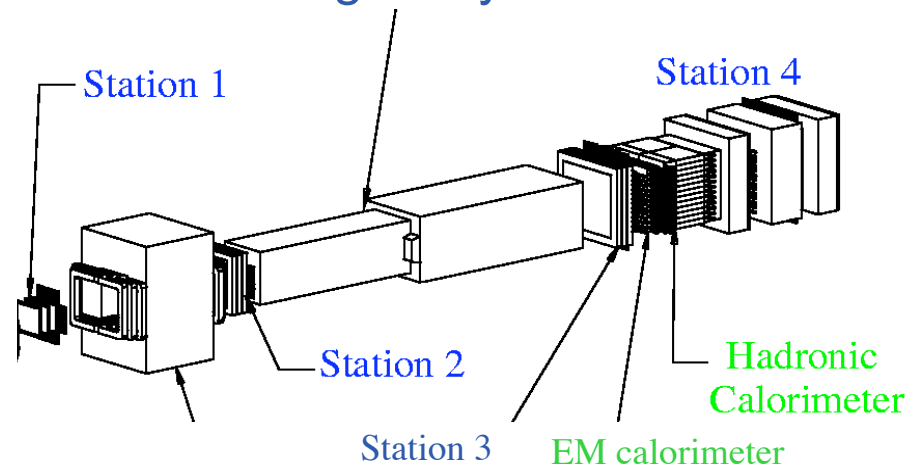
Magnets

- SM0 - ~ 1 GeV/c, used to shift acceptance to lower or higher masses, open aperture
- SM12 - up to ~ 7 GeV/c, defines acceptance, sweeps away lower momenta particles and secondaries, closed aperture at end to reduce downstream rates
- SM3 = ~ 1 GeV/c analysis magnet, used with tracking stations 1,2,3 to determine particle momenta, polarity can be changed to shift acceptance, open aperture for best momentum measurement
- Horizontal magnetic fields bend particles in vertical plane, + \downarrow



Tracking Stations

- 4 tracking stations to measure X and Y positions, beam crossing and provide fast signals to trigger system
- Stations 1,2,3 used 6 MWPC or Drift Chamber planes to precisely measure Y and get a good X value using 14° stereo geometry (UU' YY' VV')
- Station 4 used proportional tubes to provide a rough X and Y value for muons traversing the calorimetry and absorbers
- Most stations had X and Y hodoscopes, used for triggering and to mask the wire chambers during analysis



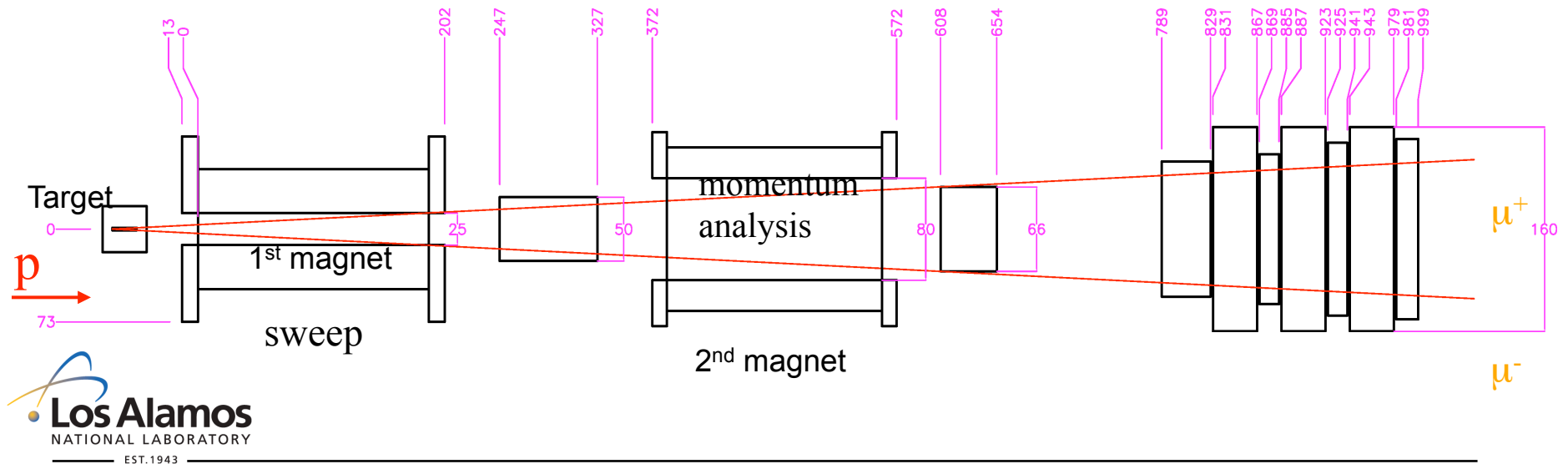
Data Format

- Data was recorded with a spill record containing scaler quantities and beam information, followed by the events in that beam spill
- Event format consisted of a number of data blocks corresponding to different detector elements
- Data blocks started with a first word identifying the detector element, followed by the encoded detector hits, ending with a last word containing the word count
- Each detector hit produced a 16 bit data word encoding the wire or hodoscope number plus drift time (where available)

Begin Run1	End of Spill1	Event1	Event2 ...	EventN	End of Spill2
Record	Record	Record	Record	Record	Record	

Major design changes for E906

- No SM0 type magnet
- Shorter solid iron sweep magnet replaces SM12
- Higher spectrometer rates require new MWPCs at first tracking station
- New drift tubes at Station 4 will provide good position resolution
- Etc.



E906 Spectrometer: Bend plane view

